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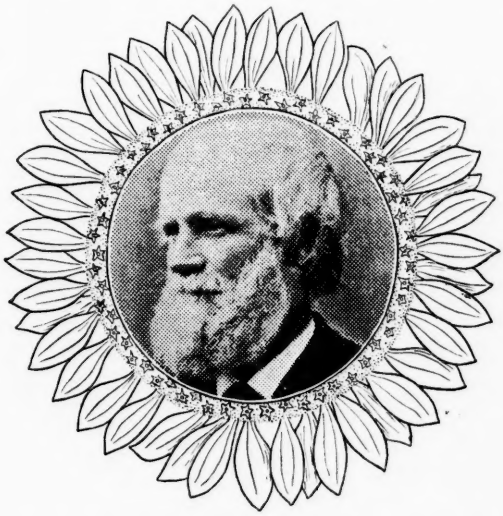

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## SYNOPSIS OF THE FAMILY CERCOPIDAE (HOMOPTERA) IN NORTH AMERICA.

*BY*

*KATHLEEN C. DOERING, Lawrence, Kansas.**

(Continued from page 64, Vol. III, No. 3.)

### KEY TO SPECIES AND VARIETIES.

1. Few deep pronotal wrinkles or distinct bands, numbering twelve or less on median line; postclypeus generally greatly inflated .....2

   Pronotal wrinkles many, usually numbering sixteen to twenty-five along median line, indistinct in **proteus** group, distinct in others; postclypeus generally moderately or slightly inflated, **saint-cyri** excepted .....11.

2. (1). Elytra fuscous brown with a distinct, broad, white band across clavus; wrinkles numbering eleven or twelve along median line .....3

   (1). Elytra without white band; wrinkles or bands less than ten on median line .....4

3. (2). Front longer than vertex; size smaller, between 3.5 mm. and 3.7 mm....**Clastoptera arizonana** Doer.

   (2). Front not more than two-thirds length of vertex; size larger, between 4 mm. and 4.5 mm..... .....**Clastoptera lawsoni** Doer.

4. (2) Mostly black in color .....5

   (2) Fuscous and brown, striped and banded in yellow .....8

5. (4) Black with white spot midway on costal margin; other hyaline or light markings on elytra and face .....6

   (4) All black above and below; front as long as or longer than vertex; length 4.6 mm. to 4.8 mm..... ..... **Clastoptera sierra** Doer.

6. (5) Postclypeus black with five or six pairs of light arcs anteriorly; elytra with apex brownish hyaline and without clear hyaline areas around apical callous; length 3.75 to 4 mm. **Clastoptera binotata** Ball.

   (5) Postclypeus without light arcs; smaller, elytra

with more or less clear hyaline areas around apical callous .....7

7. (6). Postclypeus black except for occasionally faint indications on lateral margins ..... .....**Clastoptera brunnea** Ball (black male)

(6). Postclypeus with a light band across posterior margin...**Clastoptera lineatocollis** Stal (black male).

8. (4). Larger, elongate, measuring 4.5 mm. to 4.9 mm. in length; front usually longer than vertex ..... 9

(4). Smaller, measuring between 3.4 mm. to 4.3 mm.; front usually not over two-thirds length of vertex .....10

9. (8). Greenish yellow or sometimes washed in fuscous with white veins in sharp contrast ..... .....**Clastoptera delicata** Uhler.

(8). Bronze, or brownish with markings more or less obscure on elytra; arcs and spot on postclypeus more prominent ..... **Clastoptera lugubris** Ball.

10. (8). Yellow and light fuscous with prominent yellow veins; postclypeus yellow with light spot or band, preceded by five or six pairs of arcs ..... .....**Clastoptera lineatocollis** Stal.

(8). Darker, with markings less prominent; face mostly all black..... **Clastoptera brunnea** Ball.

11. (1). Face with anterior portion shining black, rest bright yellow; wrinkles shallow or sometimes scarcely discernible .....12

(1). Face uniformly yellow or brown, or anterior portion at least chiefly yellow; wrinkles deep and usually fine .....18

12. (11). Body elongate, cell R5 longer than wide, clavus striped in yellow and black ..... .....**Clastoptera salicis** Doer.

(11). Body globose or pear-shaped; cell R5 about equal in length and width; variously patterned ..13

13. (12). Body obovate, tapering at both ends equally; entirely black above .... **Clastoptera hyperici** Gib.

(12). Body pear-shaped, widest posterior to middle; black, variously marked above with yellow and brown .....14

14. (13). Broad, with elytra greatly inflated; front approximately equal to length of vertex; black band

on postclypeus two-thirds or three-fifths its length .....15.

(13). Semi-elongate, pear-shaped, elytra moderately inflated; front not more than two-thirds length of vertex; black band on postclypeus usually not more than one-half its length .....16.

15 (14). Yellow and black striped species .....
.....**Clastoptera saint-cyri** var. **saint-cyri** Prov.

(14). All black above with brownish-hyaline apex..
..... **Clastoptera saint-cyri** var **anceps** McAtee.

16. (14). All yellow or washed in smoky hyaline .....
.....**Clastoptera proteus** var **proteus** Fitch.

(14). Mostly black or marked with black .....17

17. (16). Base of clavus yellow .....
.....**Clastoptera proteus** var **nigricollis** Fitch.

(16). All black obove except for yellow bands on head and pronotum and hyaline apex .....
.....**Clastoptera proteus** var **osceola** Ball.

18. (11). Face entirely yellow or brown .....19.

(11). Face yellow, variously marked with dark 21.

19. (18). Testaceous yellow, pronotum olive green ..20.

(18). Mostly black marked with pale yellow .....
.....**Clastoptera testacea** Fitch (male).

20. (19). Pronotal wrinkles deep, numerous, very irregular; apical callous light .....
.....**Clastoptera osborni** Gillette and Baker.

(19). Pronotal wrinkles less deep, regular, numbering about twenty-five on median line; apical callous dark .....**Clastoptera testacea** Fitch (female).

21. (18). Pronotal wrinkles irregular, deep; body tapering posteriorly; striking black and yellow species....
.....**Clastoptera distincta** Doer.

(18). Pronotal wrinkles regular, moderately deep; body not particularly tapering posteriorly; color pattern varied .....22.

22. (21). Very small, less than 4 mm. in length, **arborina** and **newporta** sometimes excepted .....23.

(21). Larger, always 4 mm. or over in length ....28.

23. (22). Uniformly dark brown or tannish brown ..24.

(22). Fuscous tan with a more or less distinct white band on clavus .....25.

24. (23). Uniformly dark brown .....

.....**Clastoptera xanthocephala** var.
..... **xanthocephala** Germ.

(23). Yellowish brown .....
.....**Clastoptera xanthocephala** var. **unicolor** Fowl.

25. (23). Usually with two dark spots on vertex and a row of six dark spots on anterior margin of pronotum and sometimes a second row of four spots across disk of pronotum **Clastoptera laevata** Fowler.
(23). Not such spots present .....26.

26. (25). More slender with margins of elytra distinctly parallel; yellow band on pronotum obscure.....
.....**Clastoptera media** Doer.
(25). More robust; yellow band on pronotum very distinct ..... 27.

27. (26). Smaller, brown bands on pronotum and elytra very distinct, standing out in sharp contrast; front sometimes longer than vertex .....
.....**Clastoptera arborina** Ball.
(26). Larger, more robust; more golden in color with brown markings less prominent; front generally equal to length of vertex .....
.....**Clastoptera newporta** Doer.

28. (22). Front at laest two-thirds length of vertex ..29.
(22). Front less than one-half length of vertex ....32.

29. (28). Fuscous and brown with usually a faint oblique band across clavus and other dark brown marks on elytra; wrinkles numbering usually between sixteen and twenty .....30.
(28). Uniformly pale yellow with no dark markings on elytra; wrinkles numbering approximately twenty-three on median line.....
.....**Clastoptera canyonensis** Doer.

30. (29). Pronotum entirely yellow; elytra lighter tan or fuscous with markings and apical veins dark brown in sharp contract; band on postclypeus and spots on genae smaller **Clastoptera juniperina** Ball.
(29). Pronotum banded with dark; elytra brownish fuscous, veins and markings not particularly prominent; band on postclypeus and spots on genae large, occupying central portion of face ..... 31.

31. (30). Pronotum with three brown bands .....
.....**Clastoptera ovata** Doer.
(30). Pronotum with middle brown band lacking....
..... **Clastoptera siskiyou** Doer.

32. (28). Posterior half of face black or sometimes mottled preceded by five or six pairs of arcs on postclypeus ..... 33.
(28). Face yellow with a dark band across middle preceded by several pairs of dark arcs ..... 35.

33. (32). Elytra fuscous brown with an oblique white band across clavus ..... 34.
(32). Elytra uniformly bronze fuscous ..... **Clastoptera obtusa** var. **tristis** Van Duzee.

34. (33). Elytra very dark fuscous brown with a very distinct white claval band ..... **Clastoptera obtusa** var. **borealis** Ball.
(33). Elytra fuscous, mottled, with white claval band much less distinct, sometimes only barely discernible ..... **Clastoptera obtusa** var. **obtusa** Say.

35. (32). Pronotum uniform yellow without brown markings; no white band indicated on elytra ....36.
(32). Pronotum yellow with usually two or three brown bands present or at least indicated; a white band across clavus ..... 37.

36. (35). Elytra light yellow, mottled faintly with fuscous; band and arcs on postclypeus abbreviated at sides ..... **Clastoptera uniformia** Doer.
(35). Elytra mostly dark fuscous except for anterior portion of clavus, which is bright tawny yellow..... **Clastoptera achatina** Germar.

37. (35). Elytra lighter fuscous tan with markings more distinct; median brown pronotal band broader and more prominent ..... **Clastoptera texana** Doer.
(35). Elytra dark fuscous brown; median pronotal band narrow, frequently interrupted through middle ..... 38.

38. (37). Usually without brown bands on anterior margins of vertex and pronotum; arcs on postclypeus very faint ..... **Clastoptera pallidocephala** Doer.
(37). Brown bands distinct on vertex and pronotum; arcs prominent on postclypeus ..... 39.

39. (38). Brown bands on vertex and pronotum very distinct, never interrupted ..... **Clastoptera tricincta** Doer.
(38). Bands less distinct; median brown band on pronotum often interrupted ..... **Clastoptera elongata** Doer.

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## SPECIFIC SYNONYMS.

Note: See the two following papers for the most recent opinions in regard to specific standing in this group;

Ball, E. D. Can. Ent. 58, p. 108, 1927.

Doering, Kathleen. C. Univ. of Kans. Sci. Bull. XVIII, p. 5, 1929.

## DISTRIBUTION.

The genus is widely distributed over the United States and Central and South Americas. For complete distribution notes of the various species see Doering (1929). The most prevalent species according to the specimens in the Snow collection and others are **xanthocephala** which is a central and southern species, **osborni** taken in Colorado and other Rocky mountain regions, **obtusa** with a general distribution everywhere, **proteus** var. **nigricollis** with also a very cosmopolitan distribution, the **arborina** group which is extensive in the west and **saint-cyri** and varieties which appear to be distinctly northern and northeastern.

## HOST PLANTS.

Of the thirty-one species of **Clastoptera** we have records regarding host plants for only sixteen species. These are as follows:- **arborina** on white cedar, **binotata** on sagebrush, **brunnea** on sagebrush (**Artemisia tridentata**) and rabbit brush, **delicata** on rabbit brush (**Chrysothamnus graveolans**) and sagebrush, **elongata** on cedar and birch, **hyperici** on St. Johns Wort (**Hypericum prolificum**), **juniperina** on red cedar, **lawsoni** possibly grape, **lineatocollis** on sage brush and mint, **obtusa** on alder, basswood, willow, oak, walnut, pawpaw, hop horn beam, blueberry, linden, beaked hazel brush, and grape, **osborni** on pine, **proteus** on dogwood, **saint-cyri** on low vegetation in Michigan, **salicis** on willow, **testacea** on pine, and **xanthocephala** on shrubs and trees of various sorts, with a preference for **Ambrosia** and **Helianthus.**

## LEPYRONIA AMYOT AND SERVILLE.

### GENERIC DESCRIPTION.

Vertex, together with front somewhat sloping, flat, angularly rounding anteriorly and with margins sharp, width together with the eyes, as wide as pronotum; front large, width and length about equal; ocelli about midway between front and pronotum, nearly equidistant from each other and from eyes; clypeus broad, moderately inflated, meeting vertex at a slightly acute angle, marked by broad striations laterad to median line; labium three-jointed, reaching middle coxae; pronotum, anterior margin slightly rounded, lateral margins almost

parallel, carinate, shorter than long diameter of eye, posterior margin deeply, roundingly emarginate, disc slightly convex, somewhat sloping anteriorly, variably depressed behind anterior margin by a transverse row of depressions; elytra coriaceous, broadly convex, costal margins expanded to middle, thence rounding regularly to acutely angulate apex, venation obscured by dense, prostate pubescence; wings, radius forked, subcosta interrupted at base; legs short and stout, hind tibia armed with two stout spines and large crescent of spines at apex; whole dorsal surface covered with dense prostrate pubescence.

## KEY TO SPECIES AND VARIETY.

(See Plate IV.)

I. Body elongate, slender, width across combined elytra less than half the length of the body; color dusky gray to deep tawny brown with a distinct fuscous V on each elytron; vertex and front broadly angulate, margins convexly rounding to apex ..... **Lepyronia quadrangularis** (Say).

Body broad, more convex, width across combined elytra at least one-half as long as body; color grayish brown or testaceous, fuscous markings on elytra indistinct or almost absent, not forming a distinct V; vertex and front narrowly angulate, margins straight ..... 2.

2. (1). Size large, 6.8 mm. —9.5 mm.; nearly uniform grayish tan; tip of vertex distinctly produced; dorsal surface covered by long golden pubescence ..... **Lepyronia gibbosa Ball.**

(1). Size small, not over 5.6 mm.; form narrow; grayish tan variously marked with fuscous and veins dark ..... 3.

3. (2). Size larger, 4.4 to 5.6 mm., deep testaceous, veins and markings fairly pronounced ..... **Lepyronia angulifera** Uhler.

(2). Size smaller, 3.5 to 4.5 mm ; cinereous gray with a tawny cast ..... **Lepyronia angulifera** var. **minuenda** Ball.

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Uhler, P. R. Bul. U. S. Geol. Geog. Surv. I, p. 346, 1876. **(Aphrophora)**.
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Walker, Francis, List of Homop., III, p. 716, 1851. **(Ptyelus)**.

## SPECIFIC SYNONYMS.

**Lepyronia sordida** Stal. Uhler, P. R. Stand. Nat. Hist. II, p. 243, 1884. **Lepyronia gibbosa** Ball.
Goding, F. W. Bull. Ill. St. Lab. Nat. Hist. III, p. 489, 1895.

## OCCURRENCE OF OTHER SPECIES.

**Lepyronia coleoptrata** (Linn). This is a common European species. Oshanin credits this species to North America. Van Duzee (Catalague), states that he was unable to trace his authority for this but that if it does occur in North America it must be Alaskan.

This species resembles **gibbosa** in shape and color pattern, varying chiefly from it by being very much smaller.

**Lepyronia sordida** Stal. Uhler (Stand. Nat. Hist. II, p. 243, 1884) records this as occurring in the northern and western states. Van Duzee (Catalogue 1917) considered this form as being **Lepyronia gibbosa** Ball.

Lallemand (Genera Insectorum) records **Lepyronia sordida** from Mexico and Illinois. Goding (Synopsis

1895) records it from Illinois on Forbes' authority. Outside of these three references there appears to be no other reports of this Mexican species occurring in the United States. However since there is always the possibility of Mexican forms being collected in the states it might be worth while to note the original description of Stal for this species.

## ORIGINAL DESCRIPTION.

Stal, C. Hemiptera mexicana-enumeravit speciesque novae descripsit. Entomologische Zeitung XXV, p. 63. 1864.

Fusco-testacea, griseo-sericea; tegminibus flavescente—griseis, vitta a basei ultra medium currente, dein introrsum flexa, fusca; alis disco fuscis. Long. cum tegm. 6½-8 mm. Statura **L. quadrangularis** Say. Caput rotundato-triangulare, thoraci aequilongum margine antico leviter attenuato; vertice planiusculo; fronte lineis transversis denudatis, medio interruptis. Thorax margine antico latissime rotundato, marginibus lateralibus anticis fere parallelis, oculo transverso nonnihil longioribus. Scutellum vertice distincte brevius. Tegmina plus duplo longiora quam, lata, paullo convexa, marginibus costali at commissurali parallelis, propius apicem angustata, apice angulum subacutum form antia.

## DISTRIBUTION.

The genus has a fairly wide distribution in this country and throughout the world. Of the three species recorded above **Lepyronia quadrangularis** (Say) is apparently the most common. Comstock has termed it the most common spittle bug of eastern United States. Ball lists it from seventeen states and Van Duzee twenty-three. **L. gibbosa** Ball seems to be the next common although it has been taken only in the region of the central states. **Lepyronia angulifera** Uhler appears to be distributed only in the south and east, being limited both in distribution and numbers. It is fairly rare, at least in the collections of Ceropidae that the writer has seen. In the Snow collection, University of Kansas, there are at present about seven hundred and fifty specimens, representing all three species and the variety.

The following states have been cited as habitat for the genus;- Colorado, Connecticut, Florida, Georgia, Iowa, Illinois, Kansas, Maine, Maryland, Massachusetts, Minnesota, Mississippi, Nebraska, North Carolina, New

Hampshire, New Jersey, New Mexico, New York, Ohio, Pennsylvania, South Dakota, Tennessee, Texas, Utah, Vermont, Washington, D. C., West Virginia, Wisconsin, and Ontario and Nova Scotia.

## HOST PLANTS.

Outside of the one species **Lepyronia quadrangularis** (Say) there are no references in the literature as to the host plants of the other species. Van Duzee and Osborn both state that **Lepyronia angulifera** Uhler was taken in moderate numbers in all places collected in Florida. Doctor R. H. Beamer while on the Kansas entomological survey collected **Lepyronia gibbosa** on prairie grass and other wild plants by sweeping but not in sandy places. Doctor Ball (Ia. Acad. Sci. XXVI, p. 143, 1919) reports that **gibbosa** is taken in sandy places and will probably prove to be a subterranean form, living on the roots of the host plants, such as three or four species of Cercopidae do. As for **quadrangularis** the writer has found it to be a general feeder, having taken nymphs which were feeding on sixty-two species of plants. Among this list nineteen families of plants were represented, the most common families being the Compositae, Gramineae and Rosaceae. (See Doering, Kans. Univ. Sci. Bull. XIV, No. 21, p. 538, 1923.) Baerg (Jour. Econ. Ento. 17, No. 5, p. 602, 1924) reported **quadrangularis** as being injurious to corn in Carroll Co. Arkansas evidently having left a timothy hay field after harvest for the corn.

## PHILAENUS STAL.

### Generic Description.

Stal, C. Stet. Ent. Zeit. XXV, p. 66, 1864.

Vertex with the anterior margin obtuse or only slightly acutely angulate, very widely sulcate, posterior margin rounding; front distinct and deeply inserted, anterior margin rounding, on each side a carina just mesad of suture between front and vertex, weak median carina with depressions each side of it; ocelli placed closer to posterior margin of vertex than to front; clypeus moderately inflated, forming an acute angle with front, disc flattened, laterally coarsely ribbed with brown; labium short and stout, composed of two equal segments, not exceeding middle coxae; pronotum, disc weakly convex, sloping, without a median carina, anterior margin roundingly angulate, deeply emarginate be-

hind, lateral margins short, parallel; equal to or less than distance between ocelli, weakly carinate; elytra coriaceous, twice longer than wide, parallel-margined or slightly convex; venation simple, both wings of corium forking and forming two elongate discoid cells, apical cells somewhat irregular, usually about five or six; whole dorsal surface of insect thickly, finely punctured and clothed with a short prostate pubescence; male plates curved dorsally at nearly right angles to abdomen.

## KEY TO SPECIES AND VARIETIES.

(See Plates 5 and 6)

1. Costal margin of elytra convex; variously marked from all straw yellow to dark brown with lighter markings but never as below; hind wing with cubitus forked at apex .....3.
   Costal margin of elytra parallel; straw yellow with fuscous stripes mesad of whitish costal margins ...2.

2. (1). Large, length approximately 8 mm. or more; straw yellow with a conspicuous dark brown stripe extending from apex of front across vertex and pronotum and along elytral suture to apex; ocelli nearer to each other than to eyes.....
   .....**Philaenus parallelus** Stearns.

   (1). Small, length not exceeding 6.5 mm.; no distinct brown stripe, on head and pronotum; ocelli equidistant from each other and to eyes .....
   ..... **Philaenus lineatus** (Linn.)

3. (1). Vertex twice wider than long; length of front distinctly greater than length of vertex on median line ..... 4.
   (1). Vertex one-third wider than long; length of front subequal to length of vertex on median line....
   .....**Philaenus canadensis** Walley.

4. (3). Uniformly all yellow or yellowish brown.....
   .... **Philaenus leucophthalmus** var. **pallidus** (Zett.)

   (3). Not uniformly yellow or yellowish brown ....5.

5. (4). Uniformly dark brown or blackish, with occasionally traces of yellow on elytra and vertex.....
   ....**Philaenus leucophthalmus** var. **leucophthalmus** (Linn.)

   (4). Dark brown or blackish with yellowish or light markings in sharp contrast or fuscous marked with yellow ..... .....6.

6. (5). All dark brown or blackish with contrasting yellow markings .....7.
(5). Fuscous and yellow species .....8.

7. (6). Vertex and anterior half of pronotum yellow, rest of dorsal surface dark brown or black .....
**Philaenus leucophthalmus var leucocephalus** (Linn.)
(6). Costal margins pale yellow, rest of elytra dark brown or black .....9.

8. (6). Elytra with broad sutural yellowish stripe; inner margins of elytra and middle of corium with a brownish stripe .....
**Philaenus leucophthalmus** var. **fabricii** Van Duzee.
(6). Elytra not striped but with two light spots on costal margin .....10.

9. (7). With vertex and anterior half pronotum pale yellow .....
**Philaenus leucophthalmus** var. **marginellus** (Fabr.)
(7). With vertex and entire pronotum dark brown or black .....
....**Philaenus leucophthalmus** var. **lateralis** (Linn.)

10. (8). All over yellowish to fuscous with two white or yellow spots on costal margin .....
**Philaenus leucophthalmus** var. **spumarius** (Fall.)
(8). Vertex and anterior half of pronotum yellow; rest dark brown with two whitish spots on costal margin .....
**Philaenus leucophthalmus** var. **fasciatus** (Fabr.)

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Linnaeus, C. Syst. Nat. Edn. 10, I, p. 437, 1758. **(Cicada)**
Faune Suec., p. 241, p. 113, 1761. **(Cicada).**
Provancher, L. Pet. Faune, Ent. Can., III, p. 258, 1889 **(Ptyelus).**
Walker, F. List Homop., III, p. 719, 1851 **(Ptyelus).**

## SPECIFIC SYNONYMS

**Aphrophora bifasciata** Fabricius—**Philaenus leucophthalmus** (Linn.).
Blanchard, E. Hist. des Ins., Hemip. p. 189, 1840.
Burmeister, J. Handb. d. Ent., II, p 122, 1835.
Germar, E. F. Mag. d. Ent. IV, p. 54, 1821—**Philaenus lineatus.**
Walker, F. List of Homop. III, p. 719, 1851. **(Ptyelus).**

**Cicada abbreviata** (Fabr.)—**Philaenus lineatus.**
Fabricius, J. C. Ent. Syst. IV, p. 36, 1794.

**Philaenus leucophthalmus** var. **falleni** Van Duzee—**Philaenus leucophthalmus** var. **spumarius** (Fallen). See note below.

**Philaenus spumarius** (Linn.).—**Philaenus leucophthalmus** (Linn.).
Baker, C. F. Can. Ent., XXIX, p. III, 1897.
Ball, E. D. Ia. Acad. Sci. for 1898, p. 223, 1898.
Edwards, J. Hemip.-Homop. Brit. Is. p. 76, 1896.
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Flor, G. Rhyn. Livl., II, p. 126, 1861.
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Metcalfe, Z. P. Jl. Elisha Mitchell Soc: XXXI, p: 16, 1915.
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Sahlberg, R. F. Cicad., p. 89, 1871.
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Stearns, L. A. Conn. Geol. and Nat. Hist. Survey, Bull. 34, p. 224, 1923.
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Van Duzee, E. P. Psyche, V, p. 240, 1890.
Van Duzee, E. P. Bull. Buf. Soc. Nat. Sci. X, p. 508, 1912.
Van Duzee, E. P. Can. Ent. XLIV, p. 327, 1912.
Zetterstedt, J. W. Fauna Lapp., p. 514, 1828.

**Ptyelus albiceps** Prov.—**Philaenus leucophthalmus** var. **leucocephalus** (Linn.).

**Ptyelus basivitta,** Walker, F. List Homop. III, p. 719, 1851.—**Philaenus lineatus.**

Note:—The writer sees no reason for adding this varietal name to the already superfluous list of varieties for this species. At present there are eight or nine varieties generally recognized in this country and fourteen varieties recognized by Oshanin in his European catalogue. Much trouble in the literature has also been caused by the fact that the name **spumarius** has been wrongly applied. Kirkaldy explains the status of this species as follows:-

"**Cicada spumaria** Linn. is not definitely known. Horvath (1899 Revue d' Entom. XVIII for 1898, p. 275) examined the Linnaean types and found the first specimen to be **Aphrophora alni** (Fallen), the second **Philaenus spumaria** Auct. and concludes that the former fits the Linnaean diagnosis better, as that notes "habitat in Salice". This however, is not stating the case quite accurately; Linne writes (1738 Systema Naturae, Ed. X, 437) "Habitat in Europae Plantis variis, frequens in **Salice viminali,** latitans intra spumam," but as **spumaria** of later catalogues never is found on Salix, I think Horvath's view must be sustained; this is the view also of Germar, Dufour, Burmeister, Rambur, Amyot and Serville etc."

Undoubtedly since the first specimen Cicada **spumaria** Linn. equals **Aphrophora alni** Fallen and the host plant notes verify this the name **Aphrophora spumaria** occupies Linnaeus' name **Cicada spumarius** as that term can only be applied to one species. This leaves the second specimen which evidently corresponds to the typical **Philaenus** running wild without a name.

However since Linnaeus' **Cicada leucophthalmus** is next in line it becomes the name of the species in question, namely **Philaenus leucophthalmus.**

The specimens of Linnaeus described under **Cicada spumarius** as being "fuscous with two white spots on elytra" and called **Cercopis spumarius** Linn. by Fallen becomes Fallen's species or variety.

Therefore it would receive the name of **Philaenus leucophthalmus** var. **spumarius** (Fallen) and not **Philaenus leucophthalmus** var. **falleni** Van Duzee as Van Duzee states in his catalogue since the name **spumarius** is not preoccupied by anything else in the genus or that particular combination of terms has never been proposed before for any other insect.

In the literature there is frequent reference to the var. **ustulatus** Fall. which usually is described as being tawny yellow with white spots on elytra. Since such a description fits the var. **spumarius** of Fallen as mentioned above and since the original description of **ustulatus** by Fallen does not correspond to this description the writer has concluded that the true **ustulatus** has not been found as yet in this country.

Fallen's description of the variety **ustulatus** is as follows: "Fem. **ustulata** supra flavescens: capite, thorace, scutello, margine elytrorum baseos apiceque nigris". No specimens of this color description have been found in the Snow collection or other collections which the writer has studied. Therefore this variety was left out of the list of American varieties.

**Distribution.**

The genus has been collected from the following localities; Alaska, Colorado, Connecticut, Illinois, Maine, Manitoba, Massachusetts, Michigan, Minnesota, Mississippi, Missouri, New Jersey, New Hampshire, New Mexico, New York, North Carolina, North Dakota, Nova Scotia, Ontario, Vermont, Quebec, Utah, Washington, and Wisconsin. Uhler says that **Philaenus lineatus** occurs in all of North America and Packard states that **Philaenus leucophthalmus** is generally distributed over North America. Osborn (1916) states that **Philaenus lineatus** is distributed especially through the northern portion, occurring from Maine to the Rocky Mountains and that it seems to occur in greatest abundance in the New England states.

## HOSTS.

**P. leucophthalmus** has been called the Meadow froghopper by Osborn (1916) as it is one of the most abundant spittle bugs occurring in the meadows (especially in Maine). He lists it as feeding on buttercup, yarrow, thistle, helianthus, orange dock, daisy, clover, primrose, choke cherry and plum as well as cultivated crops such as oats. During 1928 Mr. E. P. Breakey sent the writer some specimens of this species feeding on Baby Rambler roses in a greenhouse in Wisconsin.

Some adults of **Philaenus parallelus** according to Doctor Ball (1919) were beaten from a sedge growing in open spaces between clumps of wild cranberries in a Wisconsin swamp.

**Philaenus lineatus** which is termed the grassfeeding froghopper seems to confine itself entirely or mostly to grasses. Barber and Ellis (1922) list it from **Setaria glauca**. Garman (1921) found it on orchard grass, timothy, redtop and bluegrass while Osborn (1916) states that in the New England states it may be a distinct pest in meadows which are kept in grass for a number of years. Edwards (1896) reports it as common on all kinds of herbage in England.

## PHILARONIA Ball.

## GENERIC DESCRIPTION.

Ball, E. D. Ia. Acad. Sci: for 1898, p. 220.

Stout, heavy-set, somewhat globose forms of moderate size, having the form and dense hairy covering of a **Lepyronia** together with the sulcate vertex of a **Philaenus** and ramose venation, which is quite distinct from the type of either genus above. Vertex nearly rectangular in front, roundingly emarginate behind, distinctly longer on middle than against eye, nearly as long as the pronotum, anterior margin between eyes and front deeply sulcate, ocelli near the posterior margin, somewhat nearer each other than eyes, postclypeus strongly inflated and coarsely ribbed, except for a narrow median zone, rostrum short and stout, reaching only to the middle pair of coxae, composed of two equal segments, head with eyes scarcely as wide as the pronotum; pronotum rather small, scarcely elevated, the anterior margin broadly rounded, side margins short, oblique, carinate, distinctly shorter than distance between ocelli, claval margin long, posterior margin deeply, narrowly emarginate; elytra coriaceous, slightly more than twice

longer than wide, convex and inflated, widest across the discoid cells, costal margin sinuated and strongly reflexed just before the middle, venation irregular, ramose, the two veins on the corium forking to form discoid cells, which are broken up posteriorly to form an irregular network, which occupies the entire apical portion of the elytra, the entire venation obscured by a dense covering of fine hairs.

## KEY TO SPECIES AND VARIETIES.

(See Plate 4 and 6).

1. Elytra convex, the costal margin strongly curved, much wider than across eyes; front wider than long, anterior margin not produced beyond vertex; third longitudinal vein (cubitus) of hind wing forked.. 2. Elytra with the costal margins nearly parallel, very little wider than across eyes; front somewhat produced beyond vertex, length and width about equal; third longitudinal vein (cubitus) of hind wing entire ..... ..... 3.

2. (1). Color, reddish brown or blackish brown..... ..... **Philaronia abjectus** var. **abjectus** Uhler. (1). Color, females tawny brown, males darker, with a transverse oblique whitish band across corium, apical fourth subhyaline ..... ..... **Philaronia abjecta** var. **provana** Ball.

3. (1). General color, pale straw, costal margins of elytra broadly white, bordered mesad with fuscous, two fuscous bands enclosing a lighter one extending from tip of front, across vertex and pronotum and sometimes reaching apex of clavus ..... ..... **Philaronia bilineata** var. **bilineata** (Say). (1). Color darker than straw yellow, fuscous markings more distinct ..... 4.

4. (3). Color smoky or fuscous yellow, no distinct yellowish areas except for costal margins ..... ..... **Philaronia bilineata** var. **reticula** Ball. (3). Color much darker, fuscous brown with yellowish markings .....5.

5. (4). With whole dorsal surface dark smoky brown with white costal margin in sharp contrast ..... ..... **Philaronia bilineata** var. **nigricans** Ball. (4). With whole dorsal surface dark smoky brown with apical surface of elytra and costal margins creamy white in sharp contrast.....

.....**Philaronia bilineata** var. **orbiculata** Ball.

**Comparative Notes:—Philaronia abjecta** resembles **Lepyronia angulifera** and **Philaronia abjecta** var. **provana** is very similar in size and color pattern to **Philaenus leucophthalmus** var. **ustulatus. P. abjecta** also resembles **Philaenus leucophthalmus** in having a convex elytra and cubitus of the hind wing forked. **Philaronia bilineata** on the other hand resembles **Philaenus parallelus** and **lineatus** by being elongate and nearly parallel margined. Besides this these three species are very closely alike in color pattern, differing at a glance mostly in size with **parallelus** the larger, **bilineata** second and **lineatus** a miniature of the others. However the **Philaronia** species differ from the other genera by the dense prostrate pubescence and ramose branching of the elytral veins which separates it from **Philaenus** and **Aphrophora.** From **Lepyronia** the species are separated very easily by the sulcate vertex.

## BIBLIOGRAPHY.

Ball, E. D. Ia. Acad. of Science Bull. XXVI, p. 143, 1919. (Original description of **Philaronia bilineata** var. **reticula** and others.)

Say, Thomas. Jl. Acad. Nat. Sci. Phila. VI, p. 304, 1831. Compl. Writ. II, p. 381. (Original description of **Philaronia bilineata.**)

Stearns. L. A. Connecticut Geol. and Nat. Hist. Survey Bull. 34, p. 228, 1923.

Uhler, P. R. Bul. U. S. Geol. Geog. Survey I, p. 346, 1876. (Original description of **Philaronia abjectus.**)

## GENERIC SYNONYMS.

Baker, C. F. Can. Ent. XXIX, p. 111, 1897. **(Philaenus).**

Gillette, C. P. and Baker, C. F. Hemip. Colo. p. 71, 1895. **(Lepyronia angulifera—Philaronia abjecta** and **Philaenus.)**

Say, Thomas. Jl. Acad. Nat. Sci. Phil. VI, p. 304, 1831. **(Aphrophora).**

Uhler. P. R. Bull. U. S. Geol. Surv. I, p. 346, 1876. **(Philaenus).**

Van Duzee, E. P. Psyche, V, p. 388, 1890. **(Philaenus).**

## SPECIFIC AND VARIETAL SYNONYMS

**Philaronia americana** Bak.—**Philaronia bilineata** (Say). Baker, C. F. Can. Ent. XXIX, p. 112, 1897. **(Philaenus).**

This species is regarded as a synonym of **Philaronia bilineata** by Van Duzee, Ball, Stearns and all subsequent workers. In the original description Baker states that it has the size and form of **Philaromia bilineata** but the flatter face like **Philaenus lineatus.** The flatness of the face, however, does not prove to be a good specific character and examinations of type specimens by Ball and others shows it to be a synonym.

**Philaronia bilineata** var. **infuscatus Stearns.**—**Philaronia bilineata** var. **orbiculatus** Ball.

Stearns, L. A. Conn. Geol. and Geog. Nat. Hist. Bull. No. 34, 1923.

In the opinion of Doctor Ball (Ent. News, 39, 1928) this is synonymous with his var. **orbiculatus.** From reading the description of both authors, the writer is inclined to agree with Doctor Ball.

**Philaronia bilineata** var. **pallidus** Stearns. Loc. cited:—**Philaronia bilineata** (Say).

In regard to this variety Doctor Ball (loc. cited) states that "this variety is so near the type form as to be scarcely worth considering as a variety". The writer again agrees with Doctor Ball in sinking this varietal name for the reason that many Cercopids if taken from the spittle mass too soon fail to color up properly or in other words are teneral forms. At least the writer has had this experience with **Lepyronia quadrangularis** (Say) and **Clastoptera proteus** Fitch.

## DISTRIBUTION.

The genus has been taken from the following states in the United States; Arizona, Colorado, Connecticut, Idaho, Iowa, Kansas, Maine, Massachusetts, Montana, Nebraska, New Hampshire, North Carolina, North Dakota, South Dakota, Utah, Wisconsin, Wyoming, and from Ontario, Manitoba and Alaska. **Philaronia abjecta** seems to be more central and western in distribution ranging from Alaska to Arizona while **Philaronia bilineata** seems to be more central and eastern although occurring in Colorado very extensively too. Of the six hundred and twenty-five specimens in the Snow collection, University of Kansas **bilineata** is by far the most common species.

## HOST PLANTS.

Not a great deal is known about the host plants of this genus. Mister E. D. Fox had specimens in his collection taken on alfalfa in Wyoming. Doctor Ball reports

the larvae of **Philaronia abjecta** as being subterranean feeders on the roots and crowns of **Lupine** and **Geranium** in the mountains of Colorado. **Philaronia abjecta** var. **provana** was collected by Doctor Ball on **Helianthus grosseratus.**

## SUMMARY OF THE GENITALIA IN THE CERCOPIDAE.

Since the genitalia, both external and internal, have not been studied to any great extent in this family it seemed worthwhile to the author to make a study of these characters to determine how valuable they might be in the classification of the group.

A comprehensive study of the male and female genitalia in the genus **Clastoptera** has already been made by the author (Kans. Univ. Sci. Bull. Vol. XVIII, 1928). Here it was found that the external genitalia, both male and female, were of little value and likewise the male internal genitalia, which could only be of use in a few cases. On the other hand the inner valve of the ovipositor among the various species showed consistent variations, which though small, were nevertheless constant enough to be of considerable value, especially since other good characters were meagre in this genus.

Walley (Can. Ent. LX, 1928) published excellent drawings and descriptions of the external male genitalia of the genus **Aphrophora.** Strange to say this is the only genus where these characters are of any great value and here they are exceedingly easy to distinquish, usurping in value other structural or color characteristics. However since nothing has been done with the internal male genitalia or of the female external and internal genitalia the writer has figured as many of the eleven species as there were available for study. Among the five species represented by the male internal genitalia (See plate III) there are striking differences which can easily be discerned from a glance at the drawings. The external genitalia of eight species are figured. These, however, seem to vary too slightly to be of taxonomic value with the exception perhaps of **parallela** and **saratogensis,** both of which have the sheath of the ovipositor exserted beyond the apex of pygofer much farther than the other species. The inner valves of the ovipositor are also of some value since they vary in size and shape and kind of teeth as can be seen from the drawings. Here again the most widely distinctive are **parallela** and **saratogensis,**

the teeth of the latter being quite characteristically blunt instead of pointed as in the other five species studied. A more comprehensive study of this genus could not be made because of the lack of material for dissection.

The genus **Tomaspis** being represented by only one species in this country proves nothing in regard to the specific value of the genital structures. A glance at the drawings on Plate I, however show that the genitalia of this species is distinctly different from the other genera.

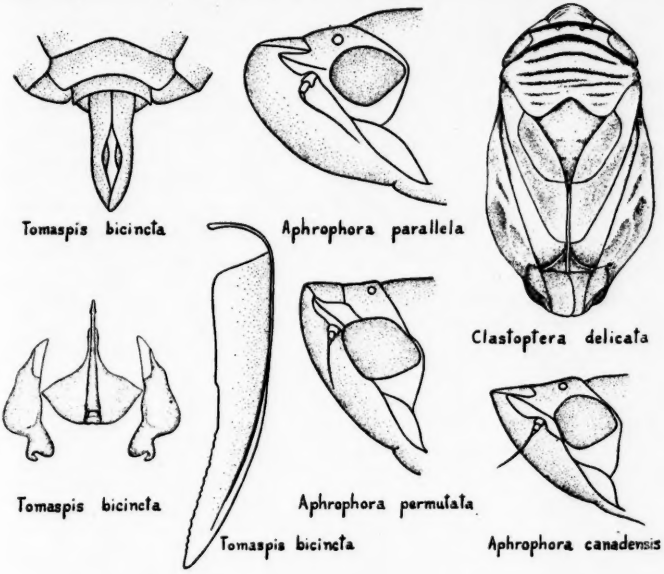
In the genus **Lepyronia** the external genitalia appeared to be of little value in separating the three species. The internal male structures on the other hand varied considerably as is shown in the drawings (Plate IV). The variety **minuenda** differs from the species **angulifera** in size but apparently in no other way. For this reason the author thought that it could not be a distinct species. The ovipositors of **quadrangularis** and **gibbosa** differ in size but apparently in no other way.

Of the four species in the genus **Philaenus** a study was made of all but **canadensis.** The differences in the genitalia can easily be seen by a study of the drawings. (Plate V). Apparently there are considerable differences in both external and internal structures. However these species are easily separated by other characteristics so that the genital structures are not so necessary as in some of the other groups. The author also dissected the genitalia of the seven color varieties of **leucophthalmus** and found no structural differences. In as much as these color variations grade into each other and also mate interchangeably, in addition to the similarity of the genitalia there can be no doubt as to their all being the same species.

The two species of **Philaronia** are also easily distinquished from each other by the genitalia, with the male genitalia showing the greatest differences. Here again the recognized color varieties show no differences in genital structure from the true species.

## NOTICE

The Index for Volume III, will be sent out with Number I, Volume IV, January 1, 1931.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Aphrophora parallela
Clastoptera delicata
Tomaspis bicincta
Tomaspis bicincta
Aphrophora permutata
Aphrophora canadensis

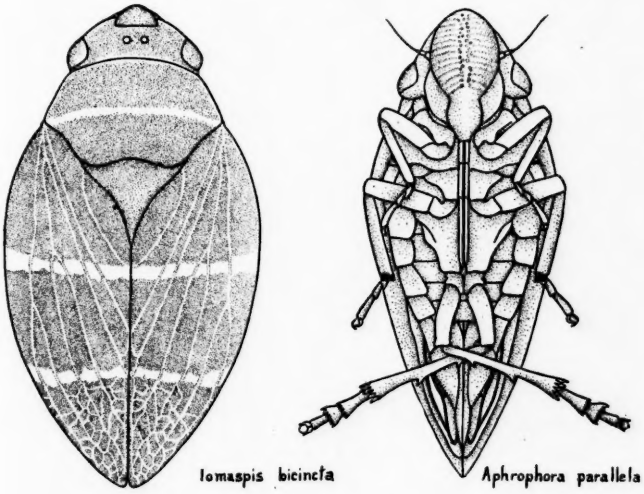
Tomaspis bicincta
Aphrophora parallela

**PLATE I.**

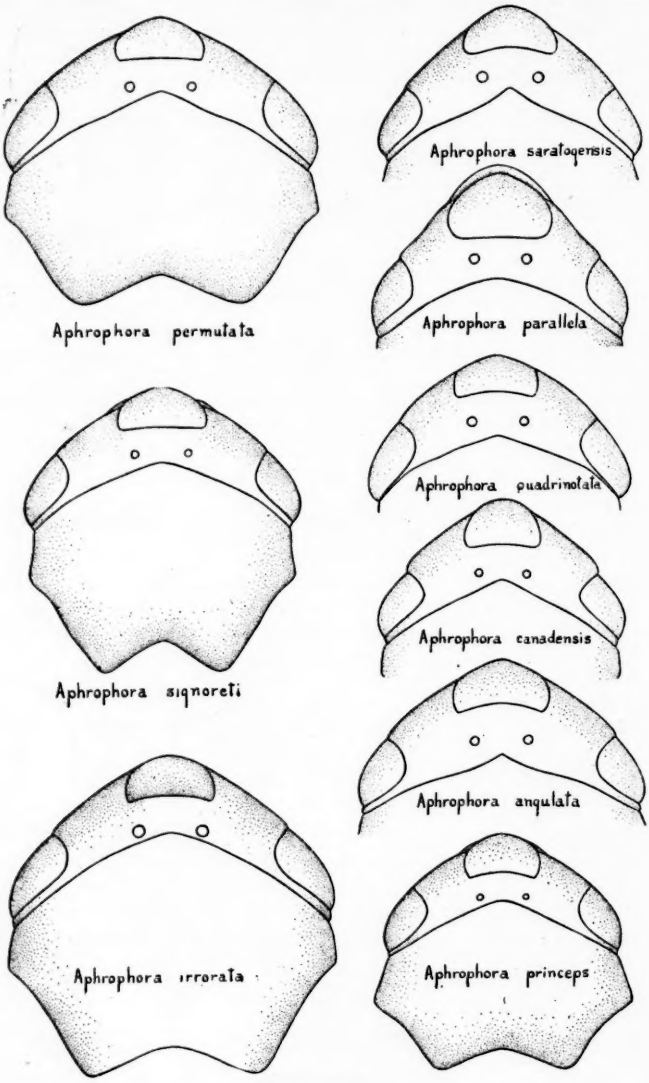
Aphrophora permutata
Aphrophora saratogensis
Aphrophora parallela
Aphrophora signoreti
Aphrophora quadrinotata
Aphrophora canadensis
Aphrophora irrorata
Aphrophora angulata
Aphrophora princeps

**PLATE II.**

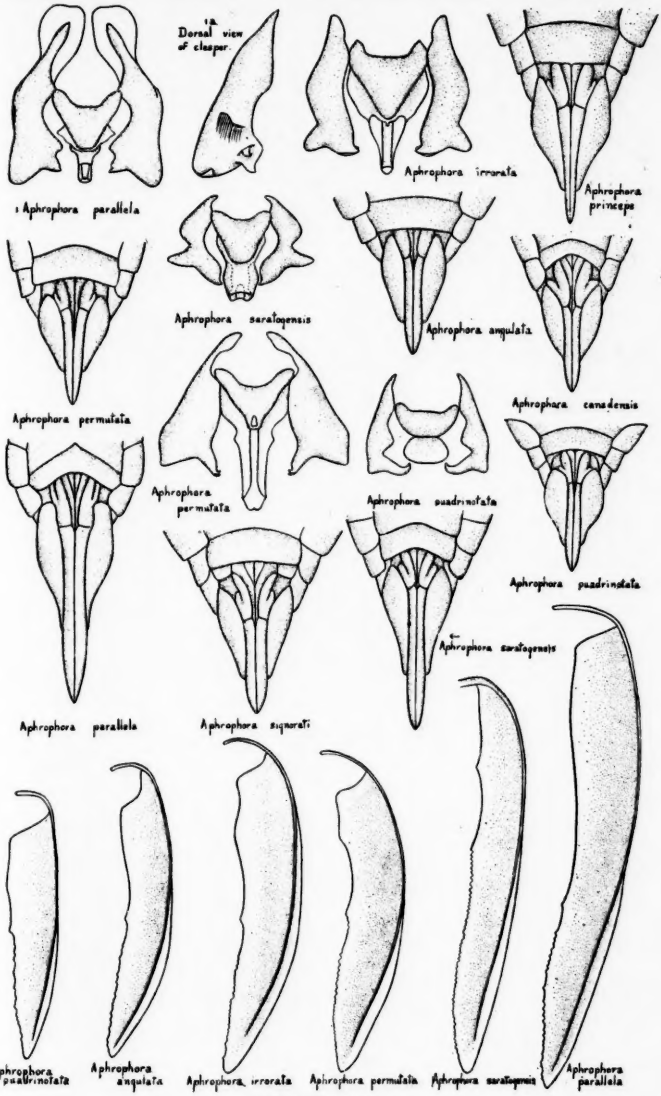
Dorsal view of clasper.
Aphrophora parallela
Aphrophora irrorata
Aphrophora princeps
Aphrophora saratogensis
Aphrophora angulata
Aphrophora permutata
Aphrophora canadensis
Aphrophora permutata
Aphrophora quadrinotata
Aphrophora quadrinotata
Aphrophora saratogensis
Aphrophora parallela
Aphrophora signorati
Aphrophora quadrinotata
Aphrophora angulata
Aphrophora irrorata
Aphrophora permutata
Aphrophora saratogensis
Aphrophora parallela

**PLATE III.**

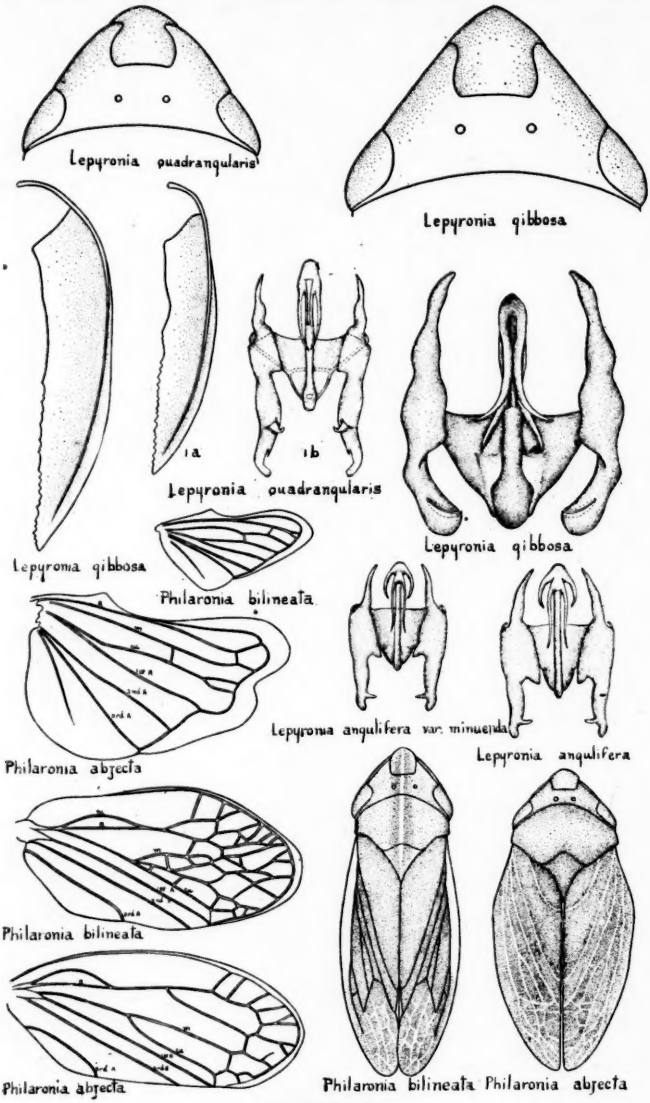
Lepyronia quadranqularis
Lepyronia gibbosa
1a
1b
Lepyronia quadranqularis
Lepyronia gibbosa
Lepyronia gibbosa
Philaronia bilineata
Lepyronia angulifera var. minuenda
Lepyronia angulifera
Philaronia abjecta
Philaronia bilineata
Philaronia abjecta
Philaronia bilineata
Philaronia abjecta

**PLATE IV.**

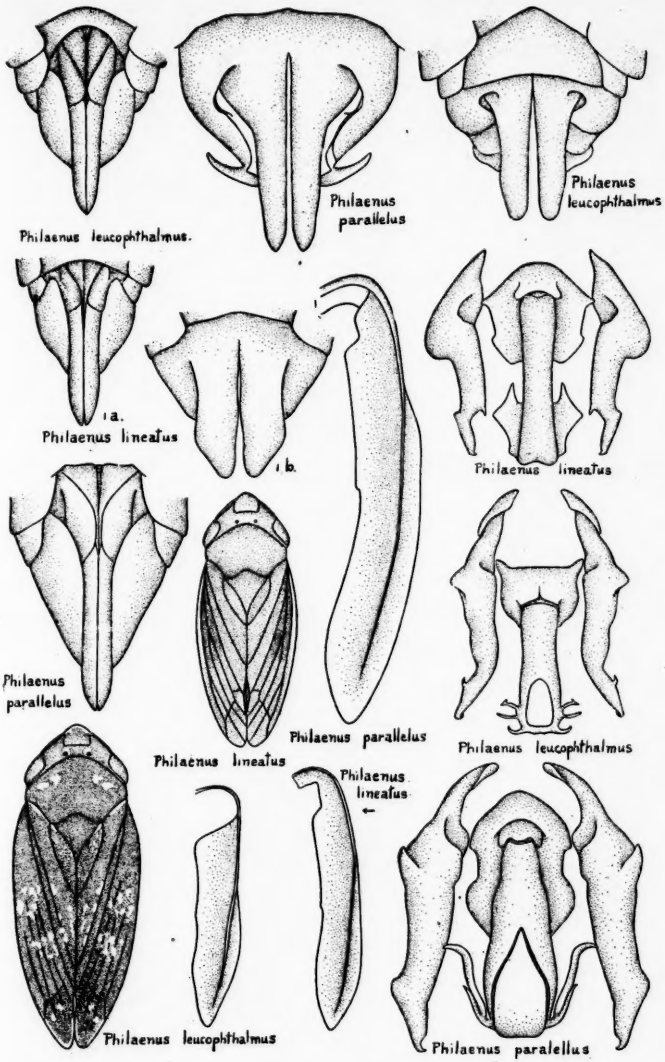
Philaenus leucophthalmus.
Philaenus parallelus
Philaenus leucophthalmus
1a.
Philaenus lineatus
1b.
Philaenus lineatus
Philaenus parallelus
Philaenus parallelus
Philaenus lineatus
Philaenus parallelus
Philaenus leucophthalmus
Philaenus lineatus
Philaenus leucophthalmus
Philaenus paralellus

**PLATE V.**

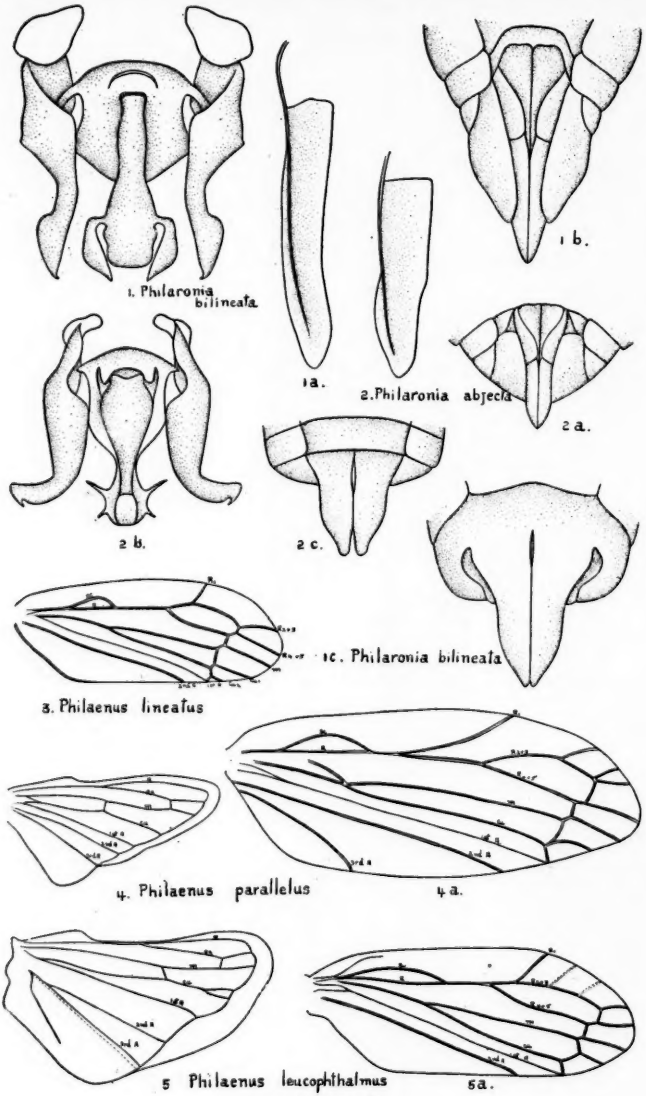
1. Philaronia bilineata
1a.
2.Philaronia abjecta
1 b.
2 a.
2 b.
2 c.
1c. Philaronia bilineata
3. Philaenus lineatus
4. Philaenus parallelus
4 a.
5 Philaenus leucophthalmus
5a.

**PLATE VI.**

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## JOURNAL OF THE KANSAS ENTOMOLOGICAL SOCIETY

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## NOTE

After January 1, 1930, Volume I, will be sold to those who wish it at $2.00 per volume. There are only a few complete sets of this volume in the hands of the Society.

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VOL. 3. 1930 INDEX

# Journal

OF THE

# Kansas Entomological Society

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## ERRATA

Page 6. Line 40—"Female" should be "male".

Page 26. Lines 3-6—Should read: "Here belong **Velia basalias** Spinola and **Velia platensis** Berg. It is much closer to **Velia basalis** Spinola than to **Velia platensis** Berg. **Velia platensis** Berg. by its shape reminds one of **Angilia albido-tinola** Stal. from Madagascar.

Page 36, Line 27—"sexnatata" should be "sexnotata"

Page 58. Line 5—Insert "3" at beginning of line.

Page 58. Cross out entire last line.

Page 84. Line 8—"laevata" should be laenata".

Page 98. Line 21—"abjectus" in both cases should be "abjecta".